



REPLACEMENT ABSTRACT



ABSTRACT

Method of electrolytically forming conductor structures from highly pure copper when producing integrated circuits

Abstract:

~~The invention relates to a~~ A method is disclosed for ~~[[of]]~~ electrolytically forming conductor structures from highly pure copper on surfaces of semiconductor substrates (wafers) ~~[[1]]~~, which surfaces are provided with recesses ~~[[2]]~~, when producing integrated circuits. The method includes the following method steps ~~[[; a.]]~~ of coating the surfaces of the semiconductor substrates ~~[[1,]]~~ which are provided with the recesses ~~[[2,]]~~ with a full-surface basic metal layer in order to achieve sufficient conductance for the electrolytic deposition, ~~[[; b.]]~~ depositing full-surface deposition of copper layers ~~[[3,]]~~ of uniform layer thickness ~~[[,]]~~ on the basic metal layer by an electrolytic metal deposition method, by bringing the semiconductor substrates into contact with a copper deposition bath, the copper deposition bath containing at least one copper ion source, at least one additive compound for controlling the physico-mechanical properties of the copper layers as well as Fe(II) and/or Fe(III) compounds, and an electric voltage being applied between the semiconductor substrates and dimensionally stable counter electrodes, which are insoluble in the bath and are brought into contact therewith, so that an electric current flows between the semiconductor substrates 1 and the counter electrodes; ~~e[[.]]~~ and structuring the copper layer ~~[[3]]~~. The electrolytic metal deposition method is accomplished by bringing the semiconductor substrates into contact with a copper deposition bath containing at least one copper ion source, at least one additive compound for controlling the physico-mechanical properties of the copper layers, and Fe(II) and/or Fe(III) compounds, and applying an electric voltage between the semiconductor substrates and dimensionally stable counter-electrodes.

(Fig. 1)